Remarks

I. Status of claims

Claims 1-38 are pending.

The dependency of claim 28 has been changed to correct a typographical error.

II. Objections to the specification

The specification has been amended to address the typographical error noted by the Examiner.

III. Claim rejections under 35 U.S.C § 112

The Examiner has rejected claims 2, 3, 7, 16, 23, 26, 31, 34, and 37 under 35 U.S.C. § 112, second paragraph, "as being indefinite."

Claims 2, 3, 7, 16, 23, 26, 31, 34, and 37 have been amended in ways that render the rejection under 35 U.S.C. § 112, second paragraph, moot.

It is noted that the MPEP § 2173.05(d) (which is cited by the Examiner in support of the rejection under 35 U.S.C. § 112, second paragraph) applies only to situations in which the claims recite examples and preferences. Since none of the claims recites any examples or preferences, MPEP § 2173.05(d) does not apply to any of the claims.

For at least these reasons, the rejection under 35 U.S.C. § 112, second paragraph, should be withdrawn.

IV. Claim rejections under 35 U.S.C § 103

A. Claims 1-11, 21-27, 29-34, and 35-38

The Examiner has rejected claims 1-11, 21-27, 29-34, and 35-38 under 35 U.S.C. § 103(a) over Curry (U.S. 5,710,636) in view of Sandford (U.S. 5,778,102) and Lapstun (U.S. 6,512,596).

1. Claim 1

Independent claim 1 has been amended and now recites:

1. A method of processing a contone image, the method comprising:

determining a bi-level bitmap of bits from a graylevel value, wherein each of the bits has a respective one of either a first value or a second value;

partitioning the contone image into an array of contone image blocks;

generating a sequence of graphical code word symbols encoding information; and

producing blocks of an output halftone image from ones of the contone image blocks and ones of the graphical code word symbols in accordance with the values of respective ones of the bits of the bi-level bitmap, wherein ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols.

Curry does not disclose or suggest the elements now recited in claim 1. For example, Curry does not disclose or suggest "determining a bi-level bitmap of bits from a graylevel value, wherein each of the bits has a respective one of either a first value or a second value" and "producing blocks of an output halftone image from ones of the contone image blocks and ones of the graphical code word symbols in accordance with the values of respective ones of the bits of the bi-level bitmap, wherein ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols."

In accordance with Curry's method, grayscale image data is halftoned using a spatially periodic, two-dimensional array of halftone cells that are derived from a set of bitmap codes (see FIG. 1, and col. 3, line 64 - col. 4, line 5). The halftone cells are encoded with digital data by rotating the cells (see FIG. 1, and col. 4, lines 22-33). In particular, selected ones of the halftone cells are rotated in such a way as to produce a human-readable pattern within the resulting halftone image (see, e.g., FIGS. 3, 5, and 6, and the corresponding descriptions in the specification). Curry does not even hint that the halftone cells of the output halftone image is produced in accordance with a bi-level bitmap of bits that is

determined from a graylevel value. To the contrary, Curry teaches that these output halftone image blocks are produced from digital data that is designed to rotate the halftone cells in a way that forms a human readable pattern (see, e.g., FIG. 3, col. 4, lines 45-56). The digital data does not constitute a bi-level bitmap of bits that is determined from a graylevel value. Instead, the digital data consists of a series of ones and zeros that are determined based on the human-readable pattern that is to be encoded in the output halftone image.

In addition, Curry does not even hint that "ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols." Indeed, there is no distinction between the ones of the output halftone image blocks that are derived from the contained image blocks and those that are derived from graphical code word symbols because, in accordance with Curry's teachings, all of the output halftone image blocks are derived from the contone image blocks and the graphical code word symbols (see FIG. 1, and col. 3, line 64 - col. 4, line 33). Each of the output halftone image blocks is encoded with either a "1" or a "0" in order to produce the human-readable patter (see col. 4, lines 57-59). For example, FIG. 3 clearly shows that the regions of the output halftone image that contain the human-readable pattern and the regions of the output halftone image that do not contain the human-readable pattern all are formed by halftone cells encoded with both ones and zeros.

Neither Sandford nor Lapstun makes-up for the failure of Curry to disclose or suggest the elements of independent claim 1 discussed above.

Thus, the cited references, taken either alone or in any permissible combination, do not disclose all of the elements of claim 1. For at least this reason, the rejection of independent claim 1 under 35 U.S.C. § 103(a) over Curry in view of Sandford and Lapstun should be withdrawn.

2. Claims 2-11

Each of claims 2-11 incorporates the elements of independent claim 1 and therefore is patentable over Curry in view of Sandford and Lapstun for at least the same reasons explained above.

3. Claim 21-27

Independent claim 21 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore, claim 21 is patentable over Curry in view of Sandford and Lapstun for at least the same reasons explained above in connection with independent claim 1.

Each of claims 22-27 incorporates the elements of independent claim 21 and therefore is patentable over Curry in view of Sandford and Lapstun for at least the same reasons.

4. Claims 29-34

Independent claim 29 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore, claim 29 is patentable over Curry in view of Sandford and Lapstun for at least the same reasons explained above in connection with independent claim 1.

Each of claims 30-34 incorporates the elements of independent claim 29 and therefore is patentable over Curry in view of Sandford and Lapstun for at least the same reasons.

5. Claims 35-38

Independent claim 35 has been amended and now recites:

> 35. A computer-readable medium storing computer-readable instructions for causing a computer to perform operations comprising:
>
> determining a bi-level bit map of bits from a graylevel value, wherein each of the bits has a respective one of two different values;
>
> partitioning a halftone image into a plurality of partitioned halftone image blocks;
>
> selecting ones of the partitioned halftone image blocks in accordance with the values of respective ones of the bits of the bitmap;
>
> identifying a sequence of graphical code word symbols from the selected ones of the partitioned halftone image blocks; and
>
> extracting information from the sequence of graphical code word symbols.

Curry does not disclose or suggest the elements now recited in claim 35. For example, Curry does not disclose or suggest "determining a bi-level bit map of bits from a graylevel value, wherein each of the bits has a respective one of two different values," "selecting ones of the partitioned halftone image blocks in accordance with the values of respective ones of the bits of the bitmap," and "identifying a sequence of graphical code word symbols from the selected ones of the partitioned halftone image blocks." In fact, the only disclosure Curry provides regarding the way in which information is extracted from the output halftone images produced by his method is as follows (col. 4, lines 63-66):

> ... As explained above, the encoded data value is based on rotation of the halftone cells relative to one another. The encoded data is typically read by a machine. Devices such as input scanners can be employed for recovering machine readable encoded data from the image....

This disclosure implies that the output halftone images produced by Curry's method are read by determining the rotational orientations of the halftone cells that make up the output halftone image. Such a process would not involve selecting ones of the partitioned halftone image blocks in accordance with the values of respective ones of the bits of a bitmap determined from a graylevel value and identifying a sequence of graphical code word symbols from the selected ones of the partitioned halftone image blocks. Indeed, as explained above in connection with independent claim 1, each of the output halftone image blocks is encoded with either a "1" or a "0" in order to produce the human-readable patter (see col. 4, lines 57-59; also see FIG. 3). Thus, information would be extracted from all of the halftone cells in Curry's output halftone images. In this case, the following elements of claim 35 would not serve any apparent useful purpose: "determining a bi-level bit map of bits from a graylevel value, wherein each of the bits has a respective one of two different values," "selecting ones of the partitioned halftone image blocks in accordance with the values of respective ones of the bits of the bitmap," and "identifying a sequence of graphical code word symbols from the selected ones of the partitioned halftone image blocks."

Neither Sandford nor Lapstun makes-up for the failure of Curry to disclose or suggest the elements of independent claim 35 discussed above.

Thus, the cited references, taken either alone or in any permissible combination, do not disclose all of the elements of claim 35. For at least this reason, the rejection of

independent claim 35 under 35 U.S.C. § 103(a) over Curry in view of Sandford and Lapstun should be withdrawn.

Each of claims 36-38 incorporates the elements of independent claim 35 and therefore is patentable over Curry in view of Sandford and Lapstun for at least the same reasons explained above.

B. Claims 12-20 and 28

The Examiner has rejected claims 1-11, 21-27, 29-34, and 35-38 under 35 U.S.C. § 103(a) over Choi (U.S. 2004/0071311) in view of Yu (2003/0174857), Curry (U.S. 5,710,636), and Sandford (U.S. 5,778,102).

1. Claim 12

Independent claim 12 recites:

> 12. A method of extracting information embedded in a halftone image, the method comprising:
>
> accessing a bi-level bit map;
>
> partitioning the halftone image into a plurality of image blocks;
>
> using the bitmap to select at least some of the blocks;
>
> identifying a code word sequence in the selected blocks; and
>
> extracting the information from the code word sequence.

The sole rationale given by the Examiner in support of the rejection of claim 12 is as follows (emphasis added):

> With regard to claim 12, Choi discloses a network camera server and digital video recorder, in that he teaches a method of extracting information embedded in a halftone image, the method comprising: accessing a bi-level bit map[;] partitioning the halftone image into a plurality of image blocks {e.g. separated into N blocks, and a bit stream is embedded into the value luminance of each image block, etc.} (Par. 0057); identifying a code word sequence in the selected blocks {e.g. inputting signals to one data sequence and simultaneously performs function of embedding the watermark information,

> etc.} (Par. 0149) and extracting the information from the code word sequence {e.g. watermark signal is embedded and extracted in the form of a certain pattern, etc.} (Par. 0053).
>
> Choi differs from claim 12, in that he does not explicitly teach that extracting information embedded in a halftone image. Yu discloses a digital watermarking on binary document, in that he teaches that Extracting information embedded in a halftone image (Figure 7, Abstract & Par. 0032).
>
> Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Choi to include extracting information embedded in a halftone image taught by Yu because it allows data to be embedded into the graph (Par. 0028).

On its face, this rationale does not show that Choi, Yu, Curry, and Sandford disclose all of the elements of claim 12. In particular, the Examiner has pointed to various section of the disclosures of Choi and Yu where he believes the "accessing," "partitioning," "identifying," and "extracting" elements of claim 12 are disclosed.[1] The Examiner, however, has not made any showing whatsoever that Choi, Yu, Curry, and Sandford, taken either alone or in any permissible combination, disclose or suggest "using the bitmap to select at least some of the blocks." Thus, the Examiner has not established that the proposed combination of the cited references discloses or suggests all of the elements of claim 12.

For at least this reason, the rejection of claim 12 under 35 U.S.C. § 103(a) over Choi in view of Yu, Curry, and Sandford should be withdrawn.

The rejection of claim 12 under 35 U.S.C. § 103(a) over Choi in view of Yu, Curry, and Sandford also should be withdrawn because the cited references, taken either alone or in any permissible combination, do not in fact disclose or suggest all of the elements of claim 12.

Choi discloses that information is embedded using either spatial or frequency domain watermarking technologies (see, e.g., ¶¶ 52, 57-59. Choi does not disclose or suggest, however, that this process involves using an accessed bitmap to select at least some of the blocks and identifying a code word sequence in the selected blocks.

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[1] The rationale given in support of the rejection of claim 12 does not explain in any way whatsoever how Curry and Sandford support the rejection of claim 12.

Yu discloses that information is extracted from document content by partitioning the document contents into graph and text, creating an object level representation of the graph, extracting groups of halftone pixels from the partitioned graph, converting the extracted halftone pixel groups into data (see FIG. 7 and ¶¶ 32-35). Yu does not disclose or suggest, however, that this process involves using an accessed bitmap to select at least some of the blocks and identifying a code word sequence in the selected blocks.

The only disclosure Curry provides regarding the way in which information is extracted from the output halftone images produced by his method is as follows (col. 4, lines 63-66):

> ... As explained above, the encoded data value is based on rotation of the halftone cells relative to one another. The encoded data is typically read by a machine. Devices such as input scanners can be employed for recovering machine readable encoded data from the image....

This disclosure implies that the output halftone images produced by Curry's method are read by determining the rotational orientations of the halftone cells that make up the output halftone image. Such a process would not involve selecting ones of the partitioned halftone image blocks in accordance with the values of respective ones of the bits of a bitmap determined from a graylevel value and identifying a sequence of graphical code word symbols from the selected ones of the partitioned halftone image blocks. Indeed, as explained above in connection with independent claim 1, each of the output halftone image blocks is encoded with either a "1" or a "0" in order to produce the human-readable patter (see col. 4, lines 57-59; also see FIG. 3). Thus, information would be extracted from all of the halftone cells in Curry's output halftone images. In this case, extracting the information involves using an accessed bitmap to select at least some of the blocks and identifying a code word sequence in the selected blocks would not serve any apparent useful purpose.

Sandford discloses that auxiliary information is extracted from host data created by a lossy compression technique in accordance with the following steps (col. 5, lines 23-35):

> ...creating a look-up table defining a correlation between the integer indices and the elements of a key-pair table; matching the decoded integer indices from the lossy digital compression representation with entries in the look-up table, for the purpose of determining correspondence of the integer indices with elements in the key-pair; constructing the auxiliary data

according to the correspondence in the look-up table between the integer indices and an element in the key-pair table; validating the content and correctness of the auxiliary data by examining header data constructed from the correspondence between the integer indices and the key-pair values; and interpreting the auxiliary bits as data unrelated to the lossy compressed data.

Sandford does not disclose or suggest, however, that this process involves using an accessed bitmap to select at least some of the blocks and identifying a code word sequence in the selected blocks.

Thus, the cited references, taken either alone or in any permissible combination, do not disclose or suggest all of the elements of claim 12. For this additional reason, the rejection of claim 12 under 35 U.S.C. § 103(a) over Choi in view of Yu, Curry, and Sandford should be withdrawn.

2. Claims 13-20 and 28

Each of claims 13-20 incorporates the elements of independent claim 12 and therefore is patentable over Choi in view of Yu, Curry, and Sandford for at least the same reasons explained above.

Claim 28 now depends from claim 21 and is patentable over the cited references for at least the same reasons explained above in connection with claim 21.

V. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 08-2025.

Respectfully submitted,

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